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White Paper

Grant Number: PF-249730

Project Title: Makah Museum Lighting Retrofit to Improve Exhibit Environment Project

Project Director: Janine Ledford

Institution: Makah Cultural and Research Center

for period 10/01/2016 to 09/31/2017

Current conditions and preservation challenges

The recent Conservation Assessment Program report, funded in part by IMLS, describes the need to improve the lighting system in the main building for both conservation and safety reasons. All of the pre-contact artifacts on display are inside glass cases that were designed and built before the opening of the museum in 1979. The original incandescent lighting was still in use and as noted in the CAP report, lacks UV filters. A combination of flood and spot lights provided lighting for the exhibits and the light fixtures were contained within each case, providing a direct heat source as well. The aged system required frequent maintenance and in some cases was beyond the fixable stage and required replacement. Environmental monitoring of a number of cases confirmed that the exhibit cases have their own microclimates directly influenced by the lighting system and that the cases have higher temperatures than the surrounding museum environment.

All of the basketry and all of the soft wood was treated with Polyethylene glycol (PEG) 540, a soluble wax substance used to stabilize the cellular structure and prevent drying and cracking. Due to the hygroscopic nature of PEG when exposed to increased temperatures and relative humidity it can move to the surface of treated artifacts, once again becoming soluble. Observation of this leaching of PEG to the surface on some of the items on exhibit caused MCRC staff to reduce the light levels even further in order to preserve the artifacts. While this provided a somewhat safer environment for the artifacts, it degraded visitor experience. Lights were dimmed so low that the color projected was far too yellow and dull to provide good viewing opportunities. Numerous visitors each year, many of whom are over 60 years of age, asked for light levels to be increased, not necessarily knowing that higher levels of light would create excessive heat and damage the artifacts.

Our concerns over the likely degradation of the objects on exhibit due to PEG leaching was supported by similar problems we have encountered involving the bulk of the material from the excavation which was identically treated, but that has been in storage, rather than on display. Expert handling of objects is necessary due to the fragility of the organic materials on display and the potential for those items to respond adversely to the change in environmental conditions when removed from their micro-climates of more than 38 years. Very few of the artifacts on display have been rotated out since the museum opened in 1979, nor had they been through a proper conservation assessment in more than 20 years. This situation was discussed with a conservator who has experience with waterlogged material during our CAP site visit. We were informed that while the artifacts appear to be in a stable condition, there may be issues occurring that we are not able to notice without more rigorous examination.

At the time of the Ozette excavation the PEG treatment of waterlogged materials was still in the experimental phase and some of these early treatments may be more vulnerable to degradation than those performed in the 1980's – 1990's. In fact, the Makah Tribe hosted an international wet site conference in 1974 where conservation experts convened to discuss the various options available for treating waterlogged material, leading to the application of some of these processes to the Ozette material. A significant amount of time has passed since these treatments were carried out and evaluation of their long term efficacy and any condition issues that may now exist was overdue. Because the current project required all of the exhibits to be removed while the cases are retrofitted with new lighting systems, this offered the best opportunity and most cost effective time for evaluation

of each object on display. During this project, the conservator was tasked with the safe handling of objects during removal from display, transport, and reinstallation within the exhibits. She provided hands-on training for MCRC staff to increase institutional capacity in collections care. The conservator also assisted with the commissioning of the new lighting system and assured that appropriate light levels are achieved.

Preventive conservation measures in place at the MCRC include a collections policy that describes the objectives and scope of collecting, guides acquisitions, accessions, loans, deaccessioning, access, ethical standards, and public disclosure. A lighting policy was developed in 2013 in response to the CAP report and in conjunction with a project to develop a lighting plan and evaluate electrical needs, upgrade the fire suppression system, and replace the security system. The lighting policy prescribes appropriate light levels and guided the transition from the old lighting system to the new system, and incorporates environmental monitoring. Additional policies were drafted in response to the CAP report and include a food policy and emergency response plan.

Pests are regularly monitored for and pest control measures are scheduled on a quarterly basis or more often if needed. The new food policy will be incorporated into the Pest Policy and will be presented to the Board of Trustees for approval. The building envelope itself provides preventive conservation measures as it was constructed with a concrete foundation and walls, and lacks windows within exhibit areas with the exception of the temporary gallery where UV film is in place.

Environmental monitoring within the exhibit cases has been incorporated since the CAP report with a limited amount of equipment currently available. Up to two data loggers are available to collect data on temperature, relative humidity (RH), and light levels. The data loggers have been deployed in various cases to collect information on these environmental conditions. Results were consistent in showing higher than acceptable heat levels, moderate relative humidity, and varied light levels depending on the amount of dimming. Excessive dimming had caused the color temperature to fall into an area of warmer color (yellow) than desired for visual acuity.

The original electric boiler heating system at the MCRC was replaced with an HVAC system in 2004. There are five different zones that have independent controls to meet the various needs of occupancy and use. Exhibit areas and archival collection spaces have specified zones to promote conditions for conservation of collections. The HVAC systems are professionally maintained on a quarterly schedule, or more frequently if necessary. Through research we have learned that the flatline approach to controlling temperature and relative humidity are no longer the norm, and that fluctuations in a wider range can be tolerated without damaging collections. We have noted that the exhibits have been maintaining temperatures independent of the heating system which may allow for additional shut down periods of the HVAC system.

The Archive/Library department also operates under collection and access policies and the archivist has been working to digitize the various collections of audio, video, manuscript, and photographs. Copies of digital records are also stored offsite as a precautionary measure in case of catastrophic events. Acid free archival supplies are utilized for storing collections, originals are separated using archival materials, objects such as staples and paperclips are removed.

The Makah Tribe has maintained ownership and control of the Ozette collection from day one; another unique aspect of the collection. The MCRC is chartered by the Makah Tribe and is responsible

for protecting and preserving its linguistic, cultural, and archaeological resources. The archaeological collections were removed from the exhibits and placed in temporary storage while the lighting was being replaced within the cases. The artifacts were moved from the main museum building across the small staff parking area to the 8,100 sq. ft. storage annex where they were temporarily stored.

Both facilities are owned by the Makah Tribe and operated by the MCRC. Both facilities have environmental controls for heat and humidity, and have fire safety and security systems in place. One of the conservation challenges was the careful handling and monitoring of the organically based collections during the transition to the new lighting system. The items on display have been in a fairly consistent environment for 37 years, though far from ideal. The challenge was to ensure the objects acclimate to the new environment without adversely impacting their physical condition. The professional services of a conservator were utilized to ensure proper care was provided to archaeological collections during project activities. In accordance with the new lighting policy, ongoing environmental monitoring was conducted during the pre-award time period to record conditions and monitor for changes in the physical appearance of the objects while instituting system shut down periods for the lights.

Addressing the Challenges

Project Activities

The proposed work plan included a number of pre-award items that needed to occur prior to project implementation. The significant items included replacing the museum roof and mitigating water intrusion through a recessed foundation area, as well as seeking additional funding for a conservation assessment and to complete the lighting retrofit of non-collections areas. A grant received through IMLS provided for repair to the exhibits that were damaged from the water intrusion but did not allow for the costs of the necessary repair work to eliminate the water intrusion.

The water inundation problem proved to be more complicated than originally anticipated due to building design and the source of the problem. Plans for a drainage system had to be engineered and carried out in order to move forward with the exhibit repair, which was completed at the end of 2016. Additionally, the main museum roofing project was delayed as the roof of our storage warehouse became an emergency and efforts were refocused to attend to that issue. A new metal roof was installed on the storage warehouse in late fall of 2016. Mitigation on the museum roof has continued and additional planning must be completed prior to initiating contracts for roof replacement to account for the potential need to mitigate asbestos removal.

The project awarded through NEH to complete a lighting retrofit at the Makah Cultural and Research Center began on time in October of 2016. The project manager began initial work with the conservator to flesh out details of the contract and identify necessary material and

supplies as well as suppliers. Supplies were ordered and on hand prior to removal and handling of artifacts from the exhibits.

The project manager worked with two volunteer groups from universities, as well as other retired professionals who volunteer at the MCRC, to create space in the storage annex in preparation for moving the artifacts off exhibit and into temporary storage. One hundred new metal shelves and two new shelving units were purchased and installed, and other collection materials were temporarily rehoused to make room for the exhibited items. Project staff worked with the local high school wood shop class to fabricate moving supports to handle oversized items for safe transport between the buildings.

Additionally, discussions and an onsite meeting with the lighting designer were carried out in the fall of 2016 to secure his services and identify any updates or changes necessary to carry out the project. Less funding was awarded than requested and the project had to be revised to cut $40,000 from budgeted costs. The major cost saving efforts were to separate the lighting products from the electrical contract. Two separate Requests for Proposals (RFPs) were prepared, one for electrical contract work and one for material suppliers to avoid contractor mark ups on the lighting products. The estimated savings on the markup was approximately 10%, which amounted to about $10,000 savings.

The RFP for suppliers was initiated in December and Due in January after the holidays. Three bids were received, all of which were over our projected budget ranging from 1.74% to 24.75%. The lighting designer worked through the lighting plans and bids diligently to make sure all items were accounted for and to make additional cost saving suggestions where possible. The contract for lighting supplies was awarded to the low bidder who also provided a 1% discount for payments received within 10 days. The MCRC requested an advance drawdown from NEH which allowed us to take advantage of the discount and reduce the projected overage on product costs. Product was ordered and shipped directly to the MCRC where staff dealt directly with receiving and inventorying the items and staging them for the electrical contractor. It was necessary to increase staff hours on the project to accommodate the extra workload, however, we estimate that even with the increased staff hours we still saved about $9,000.

The RFP for an electrical contractor was solicited in January after the specific products were identified through the supplier. A site visit for electrical contractors was held on January 18th at the MCRC with bids due January 31, 2017. With initial interest from five contractors only two submitted bids (likely due to our location) and both were over budget. The low bidder met qualifications and was awarded the contract.

In order to negotiate the contract costs the lighting designer and contract manager again looked at ways to reduce costs. Utilizing staff to install fixtures after the hardware was installed

was one cost saving measure instituted to reduce electrical contractor costs saving approximately $1,800.

The contractor began work in March of 2017. A two-day shutdown was anticipated for the museum and the public was notified through several media releases in local papers and online resources with credits provided to NEH for funding the project. The contractor was able to reduce the closed period to one day, minimally impacting regular visitation to the museum. MCRC staff, conservator, and volunteers worked with the contractors to complete work in different sections of the museum while allowing some exhibits to remain open for viewing. MCRC staff worked diligently to inform visitors of the upgrades in progress and reduced admission prices during the high impact periods of the project.

The conservator worked with staff and volunteers to instruct safe handling of artifacts and oversee difficult items that were identified in project planning. Several items received conservation treatments while they were in temporary storage and several new mounts were manufactured to allow for better stability of the artifacts on display (see conservation treatment record in appendix). All items were tracked from removal to temporary storage, and then back to display. Several items were moved off exhibit and back to permanent storage for either conservation or to improve the overall exhibit. A few new items were added to exhibits where appropriate.

We encountered significant issues with the dimming system for the larger track heads that were installed. The lighting designer worked with the manufacturer to identify and correct the issue. Different dimmers were installed where necessary to alleviate the problem. The new control system allows for automatic on/off periods as well as occupancy sensors to reduce the overall time the lights remain on.

By March 31, 2017 the overhead lighting in the exhibits had been replaced and approximately 1/3 of the exhibit case lighting was completed. The rest of the exhibit lighting and reinstallation of the exhibits was completed by early May 2017. The system was commissioned on May 2, 2017 and the punch list completed by the end of June. The project was completed on schedule and work with the local utility resulted in rebates of $10,771 for the project upgrades and were received by the end of July.

The completion of the project was slightly delayed due to a personal tragedy that affected the majority of the project team. After a period, the full team reassembled and continued reinstallation. After resuming project work the team continued to carefully and thoughtfully reinstall the priceless Ozette collection, making necessary improvements as we proceeded. The contractors and consultants operated with flexibility.

Accomplishments

The objectives of the MCRC lighting retrofit project were fairly straight forward in terms of removing an antiquated lighting system that amounted to approximately 350 heat producing incandescent fixtures that were in various stages of failure and replacing them with a new LED system.

The old incandescent lights produced excessive amounts of heat which required excessive levels of dimming to reduce the heat output. The dimmed light changed the color of light in the exhibits to a very yellow hue. Visitor feedback on the exhibits often contained comments about the difficulty in seeing the detail of the items exhibited. Upon removal of several of the old tracks the electricians brought the degraded and dangerous conditions to our attention. There were obvious signs of electrical failures and charred areas where tracks had shorted out, an electrical fire hazard that we were nothing short of lucky in avoiding.

As described above in the project activities, the new system was installed, replacing the incandescent track lighting, recessed fixtures, and a few fluorescent fixtures with LEDs. The new fixtures were connected to a control system with distinct on and off times and include occupancy sensors to further decrease the amount of time the system is on.

Prior to planning this project, the procedure at the MCRC was to leave the exhibit case lights on 24 hours per day, seven days per week. This advice was provided to MCRC staff at some point in time and was described as necessary to provide a stable environment for the artifacts on display. Through the process of researching and planning we were able to develop a written lighting policy with the assistance of a conservator which identified a much different approach to conservation. The lighting plan called for reducing overall light exposure including infrared (IR) and Ultraviolet (UV) light. The plan was introduced prior to starting the project on a small scale to monitor effects to objects in the exhibit cases. As no apparent changes were noticed between the project planning period and project implementation period, the lighting plan was implemented in programming the new system controls. On and Off times were designed around museum open periods essentially reducing the lighting in exhibits from 24 hours per day to less than 9 hours per day. This provides the artifacts with more than a 62% reduction in time of exposure to light. This figure is valid for the busy season April – September and is likely up to 13% higher in the off-season October- March.

Our project proposed to purchase dataloggers to increase capacity to monitor environmental conditions in multiple areas but due to the reduced budget the additional dataloggers were not purchased. Monitoring will continue to be conducted using the two existing dataloggers.

Lessons Learned

The overarching goal of the project was to provide a safer environment for the priceless pre-contact Ozette artifacts on display and for the MCRC's archival collection, and to enhance the opportunities for the public to experience the world-class exhibits through a clearer lens, all while reducing energy consumption and costs. The project was designed as a part of the overall continuum of necessary upgrades that were outlined by independent professionals with input from local experts, and reviewed by the MCRC Board of Trustees.

The energy required to illuminate the artifacts and archival collections is significantly less than before, but because the overall building consumption includes both heating and lights, in addition to other demands from computer equipment, printers, book binders etc, it is impossible to track exactly how much energy savings the project created. During the course of the project the HVAC system controls were not operating effectively, therefore the reduced draw from the new lighting was obscured by the increased energy use by the HVAC system. It is not the case that the removing the heat production from the old lighting system caused the heating system to work more. The building was heating to a higher than desired temperature, even though the technician was making regular adjustments. We learned that the specifics of the electrical bill do not necessarily document the improvements made by a new system.

Additionally, we learned that it is very difficult to estimate how much time would be required to properly re-install the collection. Because the estimates we made were low, we relied on skilled volunteers more than we anticipated. Fortunately, the two main project volunteers, both who have extensive experience handling Ozette artifacts, were available and willing to give time and energy to the project.

After the lighting was replaced and the collections re-installed, all visitors have the opportunity to enjoy the experience. They can see the details carved into the wooden seal clubs, whale bone war clubs, chisel handles, cedar boxes, spindle whorls, wool beaters, harpoon valves, and wooden bowls, and can appreciate the various techniques and designs used to weave the harpoon bags, fishing tackle bags, storage baskets, hats, mats, cradleboards and clothing. The beauty of the design and the mastery of the technology are now evident to all, including the older audience.

We did not anticipate how much the public would enjoy witnessing several components of the project while it progressed. They enjoyed observing the team remove the artifacts from the cases, enjoyed watching the conservator assist with removal and properly stabilize items, and they particularly enjoyed seeing artifacts put back on display and the intricate light adjustments made to beautifully illuminate the artifacts.